

Improving Health Behaviors in an African American Community: The Charlotte Racial and Ethnic Approaches to Community Health Project

Marcus Plescia, MD, MPH, Harry Herrick, MSPH, MSW, MEd, and LaTonya Chavis, MS

Racial and ethnic health disparities have become a prominent issue in national debates about health care and civil rights. Health disparities have been demonstrated in chronic and infectious diseases and in maternal and child health. Disparities are particularly well documented for cardiovascular disease. The underlying causes of health disparities are complex and include societal issues such as institutional racism, discrimination, socioeconomic status, and poor access to health care and community resources.^{1–6}

Community-based approaches have been used in a wide range of settings to address cardiovascular disease. Interventions ranged from large studies funded by the National Heart, Lung, and Blood Institute in the late 1980s, which sought to effect both individual and communitywide changes in risk behaviors, to smaller programs with more-focused intervention strategies.^{7–9} These interventions succeeded in improving health behaviors, but they focused predominantly on White, middle-class, well-educated populations. A few studies reported community interventions that reduced cardiovascular health disparities among African Americans.¹⁰ Interventions addressing other health disparities may also be effective in reducing cardiovascular disease. Combined, they provide several promising strategies for interventions in minority communities.

Community involvement is widely described as integral to reducing health disparities. Community acceptance and investment are necessary for interventions to reach sufficient saturation levels to affect population-based outcomes.^{8–11} Several models exist that engage and involve community members in the planning, implementation, and evaluation of projects.^{12–14} Studies have demonstrated a correlation between coalition development and improved health practices in minority

Objectives. We examined the effect on 3 behavioral risk factors for heart disease and diabetes (low fruit and vegetable consumption, low physical activity, and cigarette smoking) of an intervention in an African American community in North Carolina.

Methods. A community coalition, a lay health advisor program, and policy and community environment change strategies were implemented in a community of 20 000 African Americans in 2001 to 2005. Health behavior questions from the Behavioral Risk Factor Surveillance System survey were administered to a cross-section of the community annually. The results were compared with African Americans' responses from a statewide survey.

Results. All 3 health behaviors improved in the study population. Improvements were statistically significant for physical activity ($P=.02$) and smoking ($P=.03$) among women and for physical activity among middle-aged adults ($P=.01$). Lower baseline physical activity rates improved to levels comparable to those of African Americans statewide (2001, $P<.001$; 2005, $P=.38$), and comparable fruit and vegetable consumption rates became significantly higher (2001, $P=.68$; 2005, $P<.001$).

Conclusions. Our findings support the emerging role of policy and community environment change strategies and community participation as promising practices to improve health behaviors in African American communities and to reduce health disparities. (*Am J Public Health*. 2008;98:1678–1684. doi:10.2105/AJPH.2007.125062)

communities.¹¹ Successful interventions in trusted community institutions such as churches have become particularly widespread.^{10,15,16} Lay health advisors (LHAs) or community peers have been used to engage social networks and apply cultural practices specific to minority communities. LHA programs used in racial and ethnic community settings have effected changes in the attitudes of community members about their control over health issues, willingness to consider behavioral changes, and use of preventive services.^{17–21}

Health behaviors are multifaceted and are part of a larger social system of behaviors and social influences. The socioecological model recognizes that lasting influence on health behaviors evolves from changes at many levels: intrapersonal factors, interpersonal processes and groups, institutional factors, community factors, and public policy.^{22,23} Community-based intervention designs that

work across a socioecological model to include changes in policy, community environments, and institutions are more effective and sustainable than those focused only on intra- or interpersonal change.^{22–25} Changes in policy and the community environment are particularly important in racial and ethnic minority communities because of the underlying social etiologies of most health disparities. Minority communities have been found to have reduced access to healthful food and recreation resources and greater exposure to potential health risks.²⁶ Much of the data on successful policy and environment interventions have come from tobacco control. Policy interventions such as price increases and smoking bans have led to decreased tobacco use across racial and ethnic groups.^{27,28}

From 1999 to 2007, the Centers for Disease Control and Prevention funded community-based interventions through the Racial and Ethnic Approaches to Community Health

(REACH) 2010 program to address health disparities in minority communities.²⁹ The Charlotte REACH 2010 project was designed to apply and expand promising strategies to improve health disparities in cardiovascular disease and diabetes in an urban, African American community. Low physical activity; a high-fat, low-fiber diet; and smoking are established antecedents of cardiovascular disease and diabetes and were considered the most realistic outcome goals for the time frame of this project.^{7,24} We studied the communitywide effect of the Charlotte REACH interventions on these 3 modifiable risk factors.

METHODS

The project was implemented in the northwest corridor of Charlotte, North Carolina, an area that had been the focus of urban renewal efforts and was the site of a new community health center. The 14 neighborhoods of the northwest corridor included 19 670 residents, of whom 89% were African American. According to 2000 US Census data, 25% of the residents in these neighborhoods

were living below the federal poverty level, compared with 11% for the city overall.³⁰ Death rates for cardiovascular disease were 40% higher than in the rest of the county, and hospitalization rates for diabetes were almost 3 times as high.³¹

The project was designed to improve modifiable risk factors across the entire community through extensive community involvement, use of lay health advisors, and an emphasis on community environment and public policy interventions. A quasi-experimental evaluation design compared residents with African Americans across the state. The coalition prepared a competitive community action plan derived from a logic model developed by the Centers for Disease Prevention and Control (Figure 1) and received funding to implement the project over a 7-year period.

Community Involvement

The community health center was built by a regional health care system to serve the study population. A community-oriented primary care model was adopted to address the broader health issues of this community

through the following steps: (1) define a specific community of interest, (2) assess needs and assets, (3) design and implement interventions in accordance with the assessment, (4) evaluate and refine interventions, and (5) involve participants from the community in all steps.¹³

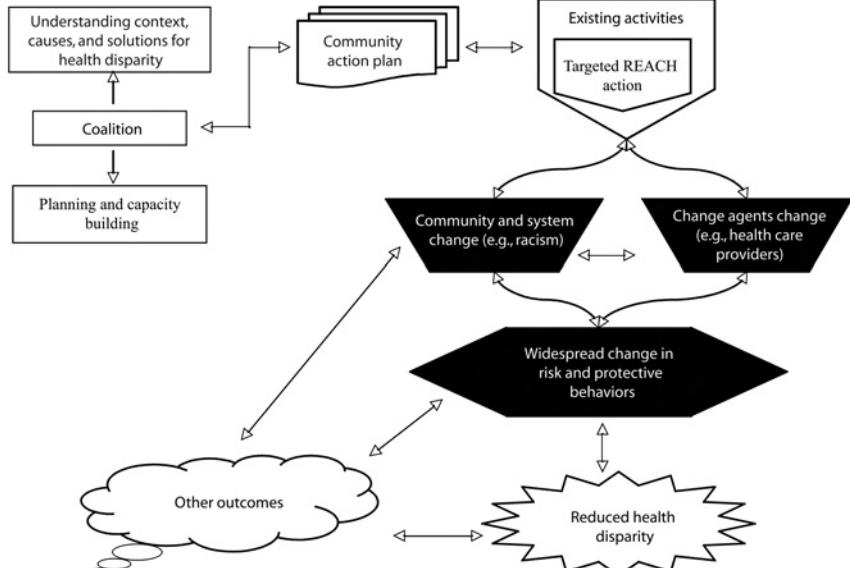
The health care system drew on the contacts and experience of the local health department and other community service providers to develop community involvement. An advisory committee was drawn from the board of a community-based substance abuse program to participate in an extensive community assessment. Health disparities were identified and cardiovascular disease and diabetes were identified as priorities.^{31,32}

During the planning year, the advisory committee expanded into a coalition that also included the health care system, county health department, and other human service providers. Decisions were made by consensus, and an external consultant mediated conflicts and provided recommendations to improve collaboration among the coalition members. Despite expected turnover in coalition membership, the number of community representatives increased over the course of the project.

Members of a grassroots community group became very engaged in the project and participated enthusiastically in early interventions. A health educator at the local health department had previously developed and convened this group to address infant mortality. For the most part, the members were not traditional community leaders. Most were retired, had worked in the service industry, and had a high school education. Five members joined the coalition, and the group participated extensively in the LHA intervention. As the project matured, the coalition formed a partnership with a neighborhood association to organize a local farmers' market. Over time, members of the neighborhood association also became active in the coalition.

Lay Health Advisor Program

The LHA program was the foundation of the Charlotte REACH project and is described in detail elsewhere.³³ LHAs were chosen by the leaders of 14 neighborhood associations and 3 community-based organizations.



Source. Reprinted with permission from Giles et al.²⁹

FIGURE 1—National Racial and Ethnic Approaches to Community Health Project (REACH) 2010 evaluation logic model.

Each was asked to nominate candidates who were outgoing, interested in the project, and well known and trusted in the community. Each LHA was required to participate in an 80-hour series of classes and workshops, taught by a team of health promotion experts from the health department and 2 community-based substance abuse prevention programs, faculty from a community college, and community activists. Participants were given information about risk factors for diabetes and cardiovascular disease and training in communication techniques, behavior change theory, social determinants of health, and advocacy. Regular monthly meetings throughout the 7-year project featured structured discussions of best practices and changes in the community to promote the role of LHAs as change agents.

Twenty-six LHAs were trained, all were African American, and 80% were older than 50 years; a regular cohort of 15 to 18 LHAs was maintained in the project. LHAs were paid \$12 per hour by a temporary agency for a maximum of 10 hours per week. Their work was overseen by a full-time coordinator and supported by a registered dietitian, registered nurse, smoking cessation health educator, and fitness specialist, who provided training and technical expertise and helped LHAs develop specific programs and campaigns. Examples included community-based exercise classes, walking groups, smoking cessation classes, and religion-based nutrition programs.

Changes in Policy and Community Environment

The Charlotte REACH project was designed on a socioecological model. Community and policy change were emphasized because these are the most difficult changes to implement. The coalition was charged with pursuing 4 objectives to improve the community environment and affect public policy: (1) increase community resources to remove barriers to healthy behavior, (2) improve quality of care in the health center, (3) initiate campaigns to change social norms, and (4) engage in political advocacy for evidence-based policy interventions.

Several projects aimed to achieve these objectives. A farmers' market was started through partnership with a neighborhood

association to improve access to fresh fruits and vegetables. The market operated 8 months per year on the grounds of the county health department. A local branch of the YMCA, which was a founding member of the coalition, expanded physical activity programs into community settings. A diabetes quality improvement project at the local health center was built on the chronic care model.³⁴ A diabetes registry was established, and a practice team participated in a statewide collaboration to improve the quality of chronic disease care in primary care practice. A culturally specific mass media campaign was conducted with a local, African American-owned public relations firm. LHAs and coalition members participated in state and local advocacy efforts to educate political leaders about the importance of raising the state tax on tobacco products and banning smoking in restaurants and bars.

Community Survey

Annual telephone surveys of health behaviors were conducted in each of the funded REACH communities for 5 years. Questions were selected from the Behavioral Risk Factor Surveillance System (BRFSS) survey.³⁵ We used BRFSS questions because the survey was designed to track Healthy People 2010 objectives, several of which were incorporated into REACH interventions, and because the survey's core questions are widely used and have undergone extensive testing and revision. Most of the core measures have been shown to have moderate-to-high reliability and validity.^{36,37}

The northwest corridor survey also followed the BRFSS sample design: household telephone numbers were randomly selected from separate blocks of listed and unlisted telephone numbers. In the northwest corridor survey, major thoroughfares defined the geographic community. According to 2000 Census data, 87% of households had telephones.³⁰

We conducted initial interviews with any REACH household member aged 18 years or older to confirm geographic eligibility. We then interviewed randomly selected adults from 2 demographic categories: (1) women aged 40 to 64 years, 1 per household, and (2) men 18 years and older and women aged 18 to 39 years or 65 years and older, 1 or more women per household. Middle-aged

women were oversampled to ensure a sufficient sample size to evaluate use of mammography and cervical cancer screening, a focus of the national REACH project.

The northwest corridor surveys took 15 minutes to administer and included 60 questions on health status, health care access, fruit and vegetable consumption, adherence to national physical activity recommendations, cigarette smoking, hypertension, cholesterol and cardiovascular disease, diabetes and diabetes care, and the use of preventive services.

We compared responses from the northwest corridor survey with responses of African Americans in the state's concurrent BRFSS survey. Modeling the northwest corridor survey and sample design after the BRFSS survey allowed us to use state BRFSS respondents as a control group for evaluating the effect of the Charlotte REACH Project.

Data Analysis

Survey weights were constructed for the northwest corridor survey. The survey weights adjusted for the probability of the phone number being selected, the probability that the screening interview failed to yield a response, and the number of telephone lines per household and persons living in the household. A final scale adjustment was applied to restore the sample proportion by age and gender to the target population.

To evaluate the effect of the northwest corridor intervention, we compared overall rates for the study measures among the northwest corridor survey population and among African Americans in the state BRFSS population for the baseline year, 2001, and 2005. We sought to determine whether (1) health behaviors under investigation were similar for the northwest corridor and state African American populations at baseline, (2) health behaviors improved in the northwest corridor population over the intervention years, and (3) improvements in the rates among the study population were also seen in the state-wide African American population.

We conducted a separate analysis of the northwest corridor and BRFSS study populations, comparing the difference in rates between 2001 and 2005 by age, gender, and educational level. We examined which

demographic groups were most likely to experience a change in health behaviors over the course of the project and whether trends observed in the northwest corridor population were also reflected in the state trends.

We used a 2-tailed *t* test for independent samples to assess the statistical significance of these proportional changes or changes in prevalence rates. The standard errors for these tests were derived from SUDAAN (Research Triangle Institute, Research Triangle Park, North Carolina) and were specifically formulated for proper variance estimation of correlated data from complex, stratified sampling designs, such as the northwest corridor and BRFSS surveys. All prevalence estimates and confidence intervals were derived from weighted data.

RESULTS

Over 5 years the number of completed interviews per year ranged from 904 to 1028. The response rates varied from 63% to 69%. The respondents in the northwest corridor survey were predominantly (95%) African American. We compared demographic characteristics of northwest corridor survey respondents and African American respondents from the state BRFSS survey (Table 1). The groups were similar, although women and older persons were slightly overrepresented in the northwest corridor group. Education categories were used as a proxy for socioeconomic class and were similar for the northwest corridor and state populations.

We compared prevalence rates of selected health behaviors among the northwest corridor and state African American communities for 2001 and 2005 (Table 2). At baseline in 2001, northwest corridor respondents were significantly more likely than were state respondents to be classified as physically inactive, defined as not meeting some or all of the national physical activity recommendations (31.9% in the northwest corridor vs 23.1% among statewide respondents; $P=.003$). The difference in these rates was no longer significant in 2005 (northwest corridor, 27.4% vs statewide, 25.5%; $P=.38$). Although fruit and vegetable consumption among the local and statewide groups was similar at baseline (northwest corridor, 23.1% vs statewide, 21.7%; $P=.68$), by 2005 northwest corridor residents were more likely than were the statewide African American respondents to eat at least 5 servings of fruits and vegetables each day (northwest corridor, 25.3% vs statewide, 17.5%; $P<.001$). African Americans in the statewide sample were consistently less likely to smoke than were northwest corridor residents throughout the course of the study.

We also compared the prevalence of health behaviors in the northwest corridor and statewide African American communities for 2001 and 2005 (Table 3). We found decreases in the percentage of respondents in the northwest corridor community who were classified as physically inactive; the rates for the statewide sample increased. We observed statistically significant decreases among women (33% northwest corridor respondents were physically inactive in 2001 vs 26.1% in 2005; $P=.02$), college graduates (28.5% vs 14.1%; $P=.01$), and respondents aged 35 to 54 years (30.3% vs 20.8%; $P=.01$). By contrast, we found a significant increase among respondents to the statewide survey aged 35 to 54 years in physical inactivity (19.4% in the statewide sample were inactive in 2001 vs 27.2% in 2005; $P=.02$).

Fruit and vegetable consumption increased in the northwest corridor population and decreased among the statewide respondents. These improvements were statistically significant among northwest corridor respondents

TABLE 1—Demographic Characteristics of African American Respondents in Local Intervention Area and Statewide Telephone Surveys in North Carolina: Charlotte Racial and Ethnic Approaches to Community Health (REACH) 2010 Project, 2001–2005

| | Charlotte REACH Population, No. (weighted %) | Statewide BRFSS Survey Respondents, No. (weighted %) |
|-------------------------------|--|--|
| Gender | | |
| Men | 1419 (36.6) | 3160 (44.2) |
| Women | 3311 (63.4) | 6654 (55.8) |
| Age, y | | |
| 18–34 | 674 (20.2) | 2403 (33.1) |
| 35–44 | 730 (17.3) | 2017 (20.9) |
| 45–54 | 960 (19.6) | 2021 (19.0) |
| 55–64 | 881 (16.2) | 1494 (11.8) |
| ≥65 | 1442 (26.0) | 1790 (14.4) |
| Did not know/answer | 43 (0.7) | 89 (0.8) |
| Education | | |
| High school or less | 1039 (22.9) | 2072 (19.8) |
| High school | 1742 (37.1) | 3407 (36.8) |
| Some college/technical school | 1124 (23.7) | 2405 (25.1) |
| College or more | 809 (16.0) | 1894 (17.9) |
| Did not know/answer | 16 (0.4) | 36 (0.5) |
| Income, \$ | | |
| <15 000 | 948 (19.7) | 1807 (14.6) |
| 15 000–24 999 | 1449 (29.8) | 2281 (23.2) |
| 25 000–34 999 | 762 (16.9) | 1371 (14.5) |
| 35 000–49 999 | 559 (11.6) | 1127 (12.3) |
| ≥50 000 | 493 (11.1) | 1295 (14.4) |
| Did not know/answer | 519 (10.9) | 1933 (21.0) |
| Total sample | 4730 (100.0) | 9814 (100.0) |

Note. BRFSS = Behavioral Risk Factor Surveillance System.

TABLE 2—Prevalence of Selected Health Behaviors Among African American Respondents in Local Intervention Area and Statewide Telephone Surveys in North Carolina: The Charlotte Racial and Ethnic Approaches to Community Health (REACH) 2010 Project, 2001 and 2005

| | Charlotte REACH Population | | Statewide BRFSS Survey Respondents | | <i>P</i> ^a |
|---|----------------------------|-------------------|------------------------------------|-------------------|-----------------------|
| | No. | % (95% CI) | No. | % (95% CI) | |
| Does not meet any physical activity recommendation ^b | | | | | |
| 2001 | 911 | 31.9 (28.3, 35.7) | 1086 | 23.1 (19.3, 27.5) | <.001 |
| 2005 | 884 | 27.4 (24.1, 30.9) | 2844 | 25.5 (23.4, 27.8) | .38 |
| Consumes ≥ 5 vegetables/fruits daily | | | | | |
| 2001 | 933 | 23.1 (20.1, 26.5) | 521 | 21.7 (16.4, 28.1) | .68 |
| 2005 | 905 | 25.3 (22.2, 28.7) | 2994 | 17.5 (15.7, 19.4) | <.001 |
| Currently smokes | | | | | |
| 2001 | 926 | 27.3 (24.0, 30.8) | 1134 | 21.1 (17.6, 25.1) | .02 |
| 2005 | 899 | 26.6 (23.3, 30.2) | 3023 | 22.3 (20.2, 24.7) | .04 |

Note. BRFSS = Behavioral Risk Factor Surveillance System; CI = confidence interval.

^aTwo-tailed *t* test, absolute difference in prevalence rates.

^bResponses about physical activity recommendations were categorized as does not meet, meets some, or meets all.

primary care model and was one of few examples of a fully implemented project derived from this model that yielded population-based outcomes.³⁹ Developing meaningful and well-integrated community involvement in a complex intervention is time and labor intensive. In our coalition, concerns of the public health staff about methodology and evidence on intervention effectiveness had to be balanced with concerns about trust and equity among community members. The legacy of racial discrimination in this Southern community was a difficult issue in our collaborative efforts. The initial planning year of the national REACH funding process and the use of a consultant to facilitate coalition processes were essential to developing strong community involvement and support. Inclusion of grassroots community partners allowed input from a diverse range of residents and more insight into the needs of hard-to-reach sections of the community.

Changes in Policy and the Community Environment

Interventions were designed and implemented on a socioecological model. The LHA program was intended to promote inter- and intrapersonal change through culturally tailored individual and group interaction. As the project matured, some LHAs began to work in institutions such as churches and the local health center. The REACH coalition was charged with overseeing the project and targeting specific changes in institutions, the community environment, and public policy through community involvement. Much of the coalition emphasis was on barriers to health behavior change, such as limited access to healthy foods, physical activity resources, and regular health care in the northwest corridor community. The neighborhood farmers' market and the YMCA partnership were highly regarded in the community and reduced perceived barriers to the resources needed for healthier behavior.³⁸ Coalition efforts to affect public policy were less extensive. Although members of the coalition participated actively in local and state tobacco control campaigns, it was difficult to define a policy agenda that was specific to the focus community because of its relatively small size and location.

with some college or technical school (21.4% in the northwest corridor in 2001 vs 33.3% in 2005; *P*=.02). Smoking rates decreased across both sample populations, but only the decline among northwest corridor women reached statistical significance (26.8% in 2001 vs 20.9% in 2005; *P*=.03).

DISCUSSION

The public health literature describes 2 generations of community-based research: the large, communitywide studies funded by the National Heart, Lung, and Blood Institute in the 1980s and the smaller, more community service-oriented studies of the 1990s.^{11,24} The REACH projects, funded by the Centers for Disease Control and Prevention, represent a new generation of community-based interventions that focus on racial and ethnic minority communities. The projects use a logic model to assess progress in addressing health disparities through 5 progressive stages: (1) capacity building, (2) targeted actions, (3) change within systems and among change agents, (4) risk and protective behavior change, and (5) elimination of health disparities (Figure 1).²⁹ The projects were intended to focus on progress in the first 3 stages in their early years, with the expectation that this

would ultimately achieve the changes in behavior necessary to decrease health disparities.

We previously reported the Charlotte REACH project's progress with the first 3 stages of the REACH logic model.^{32,33,38} Our present findings demonstrate the project's progress in changing risk and protective behavior. We found statistically significant declines in physical inactivity and smoking among women and in physical inactivity among middle-aged adults. The decreases in physical inactivity and increases in fruit and vegetable consumption were significantly greater in the northwest corridor than in the statewide African American sample.

These findings are an important addition to the public health literature because only a few well-designed studies have documented communitywide improvement in cardiovascular risk and protective behaviors among African Americans.^{11,15,16,18,19} The interventions in the Charlotte REACH project were based on promising practices from these studies. Two factors were integral to the project's success: community participation and a focus on changing policy and the community environment.

Community Participation

The Charlotte REACH project originated as an application of the community-oriented

TABLE 3—Prevalence of Selected Health Behaviors Among African American Respondents in Local Intervention Area and Statewide Telephone Surveys in North Carolina, by Sociodemographic Characteristics: The Charlotte Racial and Ethnic Approaches to Community Health (REACH) 2010 Project, 2001 and 2005

| | Does Not Meet Physical Activity Recommendations, SE (%) | | Consumes ≥ 5 Fruits or Vegetables Daily, SE (%) | | Currently Smokes, SE (%) | |
|---|---|---------------|---|--------------|--------------------------|-------------|
| | 2001 | 2005 | 2001 | 2005 | 2001 | 2005 |
| Charlotte REACH population | | | | | | |
| Gender | | | | | | |
| Men | 29.9 (3.4) | 29.5 (3.3) | 17.9 (2.8) | 21.9 (2.9) | 28.1 (3.2) | 36.0 (3.5) |
| Women | 33.0 (2.2) | 26.1** (2.0) | 26.0 (2.0) | 27.4 (1.9) | 26.8 (2.0) | 20.9* (1.7) |
| Age, y | | | | | | |
| 18–34 | 18.9 (4.0) | 18.3 (4.0) | 18.3 (3.8) | 24.1 (4.3) | 24.8 (4.3) | 27.7 (4.7) |
| 35–54 | 30.3 (2.9) | 20.8*** (2.6) | 22.0 (2.5) | 22.1 (2.6) | 36.5 (2.9) | 37.0 (3.2) |
| ≥ 55 | 39.2 (3.0) | 35.9 (2.7) | 25.9 (2.5) | 28.7 (2.4) | 19.7 (2.4) | 18.6 (2.1) |
| Education | | | | | | |
| Less than high school | 44.8 (4.2) | 43.1 (4.4) | 22.6 (3.3) | 12.8** (2.6) | 24.1 (3.5) | 30.3 (4.2) |
| High school | 29.8 (3.1) | 26.8 (2.6) | 20.8 (2.6) | 25.1 (2.4) | 30.3 (3.0) | 27.6 (2.6) |
| Some college/technical school | 23.6 (3.4) | 22.4 (3.8) | 21.4 (3.1) | 33.3** (4.2) | 29.0 (3.6) | 30.4 (4.3) |
| College or more | 28.5 (4.6) | 14.1*** (3.2) | 30.2 (4.5) | 32.5 (4.3) | 21.7 (3.9) | 14.2 (3.2) |
| Statewide BRFSS survey respondents | | | | | | |
| Gender | | | | | | |
| Men | 18.7 (3.5) | 21.3 (1.8) | 22.6 (5.4) | 13.5 (1.4) | 21.5 (3.1) | 29.1 (2.1) |
| Women | 26.7 (2.6) | 29.3 (1.4) | 21.0 (3.1) | 21.0 (1.2) | 20.8 (2.4) | 16.4 (1.0) |
| Age, y | | | | | | |
| 18–34 | 18.4 (3.3) | 19.3 (2.3) | 27.1 (5.9) | 17.5 (2.0) | 22.5 (3.6) | 24.2 (2.6) |
| 35–54 | 19.4 (2.9) | 27.2** (1.7) | 15.1 (3.1) | 16.9 (1.3) | 25.5 (3.1) | 25.0 (1.6) |
| ≥ 55 | 38.5 (5.0) | 30.5 (1.7) | 23.8 (6.5) | 18.5 (1.5) | 11.1 (2.6) | 16.6 (1.4) |
| Education | | | | | | |
| Less than high school | 40.5 (6.0) | 42.0 (3.2) | 21.5 (7.5) | 13.5 (2.1) | 27.2 (5.4) | 24.7 (3.2) |
| High school | 22.8 (3.4) | 26.4 (1.9) | 22.8 (5.4) | 16.9 (1.6) | 22.3 (3.2) | 27.4 (1.9) |
| Some college/technical school | 16.9 (3.1) | 18.2 (1.9) | 20.0 (4.7) | 18.3 (1.8) | 18.3 (2.9) | 20.1 (2.0) |
| College or more | 13.6 (3.7) | 16.1 (2.0) | 20.9 (5.1) | 22.1 (2.1) | 16.2 (4.2) | 12.8 (1.6) |

Note. BRFSS = Behavioral Risk Factor Surveillance System.

Significant change in prevalence from 2001 to 2005: *P=.03; **P=.02; ***P=.01.

Limitations

Our data on health behavior practices came from responses to BRFSS questions. Self-reported data may be subject to respondent bias. We did not collect biomedical or anthropometric markers to confirm reported behaviors.

Our data showed that the Charlotte REACH program was associated with changes in health behavior across the community. Although we described several specific approaches and interventions that were likely factors in the success of this project, we did not ask survey respondents if they had participated in or

heard of the project or any of its interventions. Therefore, the behavioral changes observed could not be directly linked with specific components of the project. Given the quasi-experimental design of this project, other external factors or events may have been responsible for these improvements in health behaviors. Urban renewal efforts were operating throughout the study period and could have affected the outcomes.

An experimental design with a comparison group from a similar urban African American community would have been more scientifically

rigorous but was beyond the scope of this project. The comparisons with African American respondents from the statewide BRFSS survey suggested that the changes observed were specific to the northwest corridor community. These 2 populations were similar in income and educational status. However, they may have differed in important cultural and geographic characteristics that were not measured but that could play a significant role in health disparity.

A project of this scale is difficult to replicate or sustain without significant external funding. The Charlotte REACH project was conducted among one of the smallest communities targeted in the projects funded by the Centers for Disease Control and Prevention. More than \$7 million was focused on a population of 20 000 over a 7-year period. Interventions in much larger communities had modest results, so a relatively small community size was chosen to maximize the effect of the interventions across the community. Although it is unlikely that resources will be available for widespread multicomponent interventions of similar magnitude, the REACH 2010 program's promising strategies could be replicated in other communities with more modest resources. The northwest corridor coalition plans to pursue funding for highly targeted interventions to expand applications of these strategies. ■

About the Authors

Marcus Plescia is with the Chronic Disease and Injury Section, North Carolina Division of Public Health, Raleigh. Harry Herrick is with the State Center for Health Statistics, North Carolina Division of Public Health, Raleigh. LaTonya Chavis is with Carolinas Healthcare System, Charlotte, NC.

Requests for reprints should be sent to Marcus Plescia, MD, MPH, Chief, Chronic Disease and Injury Section, NC Division of Public Health, 1915 Mail Service Center, Raleigh, NC 27699 (e-mail: marcus.plescia@ncmail.net).

This article was accepted January 11, 2008.

Contributors

M. Plescia originated the study, supervised all aspects of its implementation, and led the writing. H. Herrick completed the analysis and assisted with the writing. L. Chavis assisted with the study and writing. All authors helped to conceptualize ideas, interpret findings, and review drafts of the article.

Acknowledgments

This study was supported by the Centers for Disease Control and Prevention (grant U50/CCU417322).

We thank the community leaders and activists in the northwest corridor of Charlotte, North Carolina, who helped make this project successful.

Note. The contents of this article are the responsibility of the authors and do not necessarily represent the official view of the Centers for Disease Control and Prevention.

Human Participant Protection

This project was reviewed and approved by the institutional review board at Carolinas Healthcare System.

References

1. Smedley BD, Stith AY, Nelson AR, eds. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare*. Washington, DC: National Academies Press; 2003.
2. Smith DB. Racial and ethnic health disparities and the unfinished civil rights agenda. *Health Aff (Millwood)*. 2005;24:317–324.
3. Geronimus AT. To mitigate, resist or undo: addressing structural influences on the health of urban populations. *Am J Public Health*. 2000;90:867–868.
4. Lillie-Blanton M, Lavient T. Race/ethnicity. *Soc Sci Med*. 1996;43:83–91.
5. Mechanic D. Policy challenges in addressing racial disparities and improving population health. *Health Aff*. 2005;24:335–338.
6. Williams DR, Jackson PB. Social sources of racial disparities in health. *Health Aff*. 2005;24:325–334.
7. Winkleby MA, Feldman HA, Murray DM. Joint analysis of three U.S. community intervention trials for reduction of cardiovascular disease risk. *J Clin Epidemiol*. 1997;50:645–658.
8. Winkleby MA. The future of community-based cardiovascular disease intervention studies. *Am J Public Health*. 1994;84:1369–1371.
9. Merzel C, D'Aflitti J. Reconsidering community-based health promotion: promise, performance, and potential. *Am J Public Health*. 2003;93:557–574.
10. Shaya F, Gu A, Saunders E. Addressing cardiovascular disparities through community interventions. *Ethn Dis*. 2006 Winter;16:138–144.
11. Brownson RC, Smith CA, Pratt M, et al. Preventing cardiovascular disease through community-based risk reduction: the Bootheel Heart Health Project. *Am J Public Health*. 1996;86:206–213.
12. National Center for Chronic Disease Prevention and Health Promotion. *Planned Approach to Community Health: Guide for the Local Coordinator*. Available at: <http://www.cdc.gov/nccdphp/publications/PATCH>. Accessed March 6, 2008.
13. Rhyne R, Cushman SB, Kantrowitz M. An introduction to community-oriented primary care. In: Rhyne R, Bogue R, Kukulka G, Fulmer H, eds. *Community-Oriented Primary Care: Health Care for the 21st Century*. Washington, DC: American Public Health Association; 1998.
14. Macaulay AC, Commanda LE, Freeman WL. Participatory research maximizes community and lay involvement. North American Primary Care Research Group. *BMJ*. 1999;319:774–778.
15. Wilcox S, Laken M, Bopp M, et al. Increasing physical activity among church members: community-based participatory research. *Am J Prev Med*. 2007;32:131–138.
16. Campbell M, Demark-Winfred W, Symons M, et al. Fruit and vegetable consumption and prevention of cancer: the Black Churches United for Better Health Project. *Am J Public Health*. 1999;89:1390–1396.
17. Eng E, Parker E. Natural helper models to enhance a community's health and competence. In: DiClemente RJ, Crosby RA, Kegler MC, eds. *Emerging Theories in Health Promotion Practice and Research: Strategies for Improving Public Health*. San Francisco, CA: Jossey-Bass; 2002:101–126.
18. Krieger J, Collier C, Song L, Martin D. Linking community-based blood pressure measurement to clinical care: a randomized controlled trial of outreach and tracking by community health workers. *Am J Public Health*. 1999;89:856–867.
19. McNabb W, Quinn M, Kerver J, Cook S, Garrison T. The PATHWAYS church-based weight loss program for urban African-American Women at risk for diabetes. *Diabetes Care*. 1997;20:1518–1523.
20. Earp JA, Eng E, O'Malley MS, et al. Increasing use of mammography among older, rural African American Women: results from a community trial. *Am J Public Health*. 2002;92:646–654.
21. Mock J, McGhee SJ, Nguyen T, et al. Effective lay health worker outreach and media-based education for promoting cervical cancer screening among Vietnamese American women. *Am J Public Health*. 2007;97:1693–1700.
22. McElroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. *Health Educ Q*. 1988;15:351–377.
23. Sallis JF, Owen N. Ecological models of health behavior. In: Glanz K, Rimer BK, Lewis FM, eds. *Health Behavior and Health Education: Theory, Research, and Practice*. San Francisco, CA: Jossey-Bass; 2002:462–484.
24. Mittlemark MB, Hunt MK, Heath GW, Schmid TL. Realistic outcomes: lessons from community-based research and demonstration programs for the prevention of cardiovascular diseases. *J Public Health Policy*. 1993;14:437–462.
25. Brownson RC, Haire-Joshu D, Luke DA. Shaping the context of health: a review of environmental and policy approaches in the prevention of chronic disease. *Annu Rev Public Health*. 2006;27:341–370.
26. Horowitz CR, Colson KA, Hebert PL, Lancaster K. Barriers to buying healthy foods for people with diabetes: evidence of environmental disparities. *Am J Public Health*. 2004;94(9):1549–1554.
27. Gottlieb NH, Eridsne MP, Lovato CY, et al. Impact of a restrictive worksite smoking policy on smoking behavior, attitudes and norms. *J Occup Med*. 1990;32:16–23.
28. Chaloupka FJ, Pacula RL. Sex and race differences in young people's responsiveness to price and tobacco control policies. *Tob Control*. 1999;8:373–377.
29. Giles W, Tucker P, Brown L, et al. Racial and ethnic approaches to community health (Reach 2010): an overview. *Ethn Dis*. 2004;14(S1):5–8.
30. Statistical Abstract of the United States: 2000. Washington, DC: US Bureau of the Census; 2000.
31. Plescia M, Koontz S, Laurent S. Community assessment in a vertically integrated health care system. *Am J Public Health*. 2001;91:811–814.
32. Plescia M, Groblewski MA. Community oriented primary care demonstration project: refining interventions for cardiovascular disease and diabetes. *Ann Fam Med*. 2004;2:103–109.
33. Plescia M, Groblewski M, Chavis L. A lay health advisor program to promote community capacity and change. health promotion practice. *Health Promot Pract*. Published online November 14, 2006. doi:10.1177/1524839906289670.
34. Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness. *JAMA*. 2002 October 9;288:1775–1779.
35. Centers for Disease Control and Prevention. *Behavioral Risk Factor Surveillance System Survey Questionnaire*. Atlanta, GA: US Dept of Health and Human Services; 2001.
36. Nelson DE, Holtzman D, Bolen J, Stanwyck CA, Mack KA. Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). *Soz Praventivmed*. 2001;46(suppl 1):S3–S42.
37. Balluz L, Ahluwalia IB, Murphy W, Mokdad A, Giles W, Harris VB. Surveillance for certain health behaviors among selected local areas—United States, Behavioral Risk Factor Surveillance System, 2002. *MMWR Surveill Summ*. 2004;53(SS05):1–100.
38. Debate R, Plescia M, Joyner D, Spann LP. A qualitative assessment of Charlotte REACH: an ecological perspective for decreasing CVD and diabetes among African-Americans. *Ethn Dis*. 2004;14(3S1):77–82.
39. Mullan F, Epstein L. Community-oriented primary care: new relevance in a changing world. *Am J Public Health*. 2002;92:1748–1755.